

MATHEMATICAL PROCESS—PROBLEM SOLVING



THE ONTARIO CURRICULUM, MATHEMATICS, 2005

Students will develop, select, apply, and compare a variety of problem solving strategies as they pose and solve problems and conduct investigations, to help deepen their mathematical understanding.

Problem solving is central to learning mathematics. It forms the basis of effective mathematics programs and should be the mainstay of mathematical instruction. Problem solving is considered an essential process through which students are able to achieve the expectations in mathematics, and it is an integral part of the mathematics curriculum in Ontario.

ROLE OF STUDENTS

Planning:

- Understand the problem
- Try different techniques and strategies
- Generate some examples
- Ask thoughtful questions

Collecting data related to the problem:

- Take and record measurements
- Search the Internet for secondary data
- Check that data being gathered is appropriate to the inquiry at hand

Selecting and applying a problem solving strategy:

- Include some of the following strategies: draw a diagram or picture; make a simpler but similar problem; create a mathematical model; work backwards; use a formula; look for a pattern; guess and check; make and state assumptions; make a scale drawing; make an organized list; use logical reasoning; consider alternative strategies and/or blend strategies; ask if the answer is reasonable
- Incorporate different strategies over time

SAMPLE QUESTIONS

- How does this problem remind you of a problem you have solved before?
- What are the connections between this problem and the one we solved last week?
- What are some specific cases in this problem?
- How would you state this problem in your own words?
- What problem solving strategies have you tried?
- What strategy will you try next?
- What were the advantages and disadvantages of the strategies you tried?
- Which strategies can you combine to help you solve this problem?
- What factors make this a difficult problem?
- What are some of the complexities of this problem?

SAMPLE FEEDBACK

- Take a few minutes to talk with other groups, and check back with me.
- Think about how you can apply this strategy more efficiently.
- Consider some specific cases first.
- Find someone who has used a different strategy to solve this problem and talk about your approaches.
- Please explain the strategy you used.
- How does this relate to the problem?
- Reread the problem to identify the most important aspects and facts to consider.
- Reread the problem and consider a different perspective.